

Remarks

Claims 1-19 are pending. Claims 1-10 and 14-15 have been amended. Claims 11 and 12 have been canceled. New Claims 16-19 have been added. Claims 1-10 and 14-15 were amended to more clearly claim what applicants consider to be their invention. Support for the amendments can be found in the original claims and in the specification.

I. CLAIM REJECTIONS UNDER 35 U.S.C. § 101 and § 112

The Office Action has rejected claims 11-12 under 35 U.S.C. § 101 and 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 11-12 have been cancelled from the application. Therefore, this rejection should be withdrawn.

II. CLAIM REJECTIONS UNDER 35 U.S.C. § 102

A. Rejections of Claims 1-14 under 35 U.S.C. § 102(b)

The Office Action has rejected Claims 1-14 under 35 U.S.C. § 102(b) as being anticipated by US 5,932,514 to Ernst *et al.* (hereinafter "Ernst") and by Fischer *et al.* [Makromol. Chem., Macromol. Symp. 66, 191-202 (1993)] (hereinafter "Fischer"). While applicants respectfully disagree with this rejection, Claims 1-10 and 14 have been amended to more clearly claim what the applicants consider to be their invention and to clearly distinguish the claims from Ernst and Fischer. Claims 11-12 have been cancelled from the application. Claim 13 is dependent from amended Claim 10. The amended claims of the present invention are patentably distinguishable from Ernst and Fischer.

Claim 1 of the present invention, as amended, is directed towards an isolated, particulate, unsupported catalyst system. Ernst teaches a supported catalyst system, wherein an inorganic support is reacted with an aluminoxane and a polyfunctional crosslinker. Ernst fails to teach a process for producing an unsupported catalyst system. Ernst also fails to teach the formation of a particulate suspension upon reaction of an aluminoxane and a Lewis base. The use of a support in Ernst does not allow for the formation of such particulate suspension. Therefore, Claim 1 is not anticipated by Ernst.

Fischer teaches a homogeneous catalyst system, wherein a methylaluminoxane and a Lewis base are contacted in solution, followed by addition of a monomer material and a metallocene catalyst. Fischer teaches a catalyst system “which is truly homogeneous, i.e., the catalyst as well as the polymer remain in solution during polymerization” (page 193, lines 38-39). In Fischer, an aluminoxane and a Lewis base are contacted in solution and remain in solution. Monomer is subsequently added to the reaction flask, followed by the addition of a metallocene catalyst. Fisher fails to teach either the formation of a particulate catalyst system or the isolation of the catalyst system. It is not possible to isolate the catalyst system in Fischer because the monomer is added to the reaction flask prior to the addition of the metallocene catalyst. Therefore, Claim 1 is not anticipated by Fischer.

Claim 10 has been amended to more clearly reflect that the catalyst produced by the process of Claim 1 is isolated and unsupported. As described above, Ernst teaches a process for preparing a supported catalyst system. The process described in Ernst cannot produce the unsupported catalyst system of the present invention. Similarly, Fischer teaches a solution phase

process for polymerizing olefins wherein all components of the catalyst system remain in solution. The components of the Fischer catalyst system are never combined in the absence of a monomer, and thus, the catalyst system cannot be isolated. Therefore, Claim 10 is not anticipated by either Ernst or Fischer.

Newly added Claim 16 is novel over Ernst and Fischer. Claim 16 is directed to a process for producing an insoluble or slightly soluble particulate suspension by reacting an aluminoxane and a Lewis base in a hydrocarbon solvent. Ernst fails to teach the formation of a particulate suspension upon reaction of an aluminoxane and a Lewis base. In Fischer, an aluminoxane and a Lewis base are contacted in solution and remain in solution. Fischer fails to teach the formation of a particulate catalyst system. Therefore, newly added Claim 16 is not anticipated by either Ernst or Fischer.

Because Claims 1, 10, and 16 are novel, dependent claims 2-9, 13-14, and newly added claims 17-18 are also novel over Ernst and Fischer. Newly added Claim 19 is dependent from Claim 15, which has not been rejected under 35 U.S.C. § 102. The claims of the present invention, as amended, are novel over both Ernst and Fischer and, as such, the rejections should be withdrawn.

B. Rejections of Claim 10 under 35 U.S.C. § 102(b)

The Office Action has rejected Claim 10 under 35 U.S.C. § 102(b) as being anticipated by EP 0630910 A1 to Brady III *et al.* (hereinafter “Brady”), WO 93/13140 to Canich *et al.* (hereinafter “Canich”), WO 98/20045 to Goode *et al.* (hereinafter “Goode”), US 6,025,407 to Nagy *et al.* (hereinafter “Nagy”), and US 5,908,903 to Rosch (hereinafter “Rosch”). While

applicants respectfully disagree with this rejection, Claim 10 has been amended to more clearly claim what the applicants consider to be their invention and to distinguish the present invention from the references cited in the Office Action.

The amendment to Claim 10 clarifies that the catalyst produced by the process of Claim 1 is isolated and unsupported. As amended, Claim 10 is patentably distinguishable from Brady, Canich, Goode, Nagy, and Rosch.

Brady teaches an olefin polymerization catalyst that is produced by the combination of a metallocene and an aluminoxane. A Lewis base can be added to the reaction vessel to reduce activity or terminate the polymerization reaction, but Brady fails to teach the combination of an aluminoxane and a Lewis base to form a particulate suspension. While a Lewis base can be added to the polymerization process described in Brady, it does not produce the catalyst system of the present invention. Moreover, Brady does not teach isolation of a catalyst system comprised of an aluminoxane, a Lewis base, and a metallocene. In fact, the catalyst system cannot be isolated in the process described by Brady.

Canich teaches both a supported catalyst system and a soluble, solution phase catalyst system for olefin polymerization, but fails to teach an unsupported catalyst that can be isolated.

Goode teaches the addition of an antifouling agent to a polymerization system, wherein the antifouling agent may be a Lewis acid. The catalyst in Goode is formed from aluminoxane and metallocene and is introduced in unsupported, liquid form. The Lewis base antifouling agent is introduced after the catalyst composition is formed. The catalyst system of Goode is therefore not capable of being isolated and is distinguished from that of the present invention.

Nagy teaches a process for photopolymerizing vinyl chloride using a metallocene, aluminoxane, and Lewis base catalyst system. Nagy describes adding a catalyst/cocatalyst/base mixture to a pressure tube prior to the introduction of monomer, but Nagy is silent on the preparation of this mixture. Nagy does not teach a particulate catalyst system that is isolated.

Rosch also teaches a metallocene, cocatalyst, and Lewis base catalyst system for olefin polymerization, but fails to teach an isolated catalyst system. Rosch does not disclose or teach the formation of a particulate suspension, as required in Claim 1, step a) of the present invention. As no catalyst is isolated, Rosch cannot anticipate the catalyst of the present invention.

Claim 10, as amended, is patentably distinguishable from Brady, Canich, Goode, Nagy, and Rosch, as none of the references produce an unsupported and isolated catalyst system. Therefore, the rejections should be withdrawn.

Newly added Claim 17 is directed to an isolated suspension of unsupported catalyst particles produced by the process of Claim 1. Claim 17 is also novel over the references cited as none of the references produce an unsupported and isolated catalyst.

III. CLAIM REJECTIONS UNDER 35 U.S.C. § 103

A. Rejection of Claims 1-9 and 11-14 under 35 U.S.C. § 103(a)

The Office Action has rejected Claims 1-9 and 11-14 under 35 U.S.C. § 103(a) as being unpatentable over Brady, Canich, Goode, Nagy, and Rosch. Applicants respectfully disagree with this rejection for the following reasons.

None of the references would have rendered the claimed invention obvious. The present invention is directed towards a process for preparing an unsupported and isolated catalyst system

for olefin polymerization. While all of the references relate to the general field of olefin polymerization, none teach or suggest the preparation of an unsupported and isolated catalyst system. As described above, the references describe either supported catalyst systems or unsupported catalyst systems that are not isolated. The references that teach the use of supported catalysts are directed towards heterogeneous systems, wherein the support provides the particulate material necessary for heterogeneous catalysis. The remaining references are directed towards solution phase or homogeneous systems, wherein no catalyst is isolated. There would not have been any motivation to one of skill in the art to modify any of the cited references to prepare the catalyst system of the present invention.

Brady is directed towards a method of controlling activity and/or terminating a polymerization reaction through the addition of a Lewis base, while the reaction itself is initiated utilizing a two component catalyst formed from metallocene and aluminoxane. There is no suggestion or motivation in Brady to first combine the activity controlling Lewis base to an aluminoxane prior to the addition of a metallocene.

Canich is directed towards both a supported catalyst system and a soluble, solution phase catalyst system for olefin polymerization. While Canich teaches these two approaches, there is no motivation or suggestion to produce an unsupported, isolated catalyst system.

Goode is directed towards antifouling agents in olefin polymerization. The catalyst system of Goode is a combination of a metallocene catalyst and an aluminoxane cocatalyst, in unsupported, liquid form. There is no suggestion or motivation in Goode to first combine the

antifouling agent with an aluminoxane cocatalyst to form a particulate suspension or to form an unsupported and isolated catalyst system.

Nagy is directed towards photopolymerization of vinyl chloride monomer and discloses the simultaneous mixing of catalyst, cocatalyst, and base components. There is no motivation or suggestion in Nagy to produce an unsupported and isolated catalyst system by first reacting an aluminoxane and a Lewis base to produce a particulate suspension. Further, Nagy does not suggest an unsupported catalyst system that is isolated.

Rosch is directed towards a catalyst system for olefin polymerization. Rosch does not teach or suggest the formation of a particulate suspension by first reacting an aluminoxane and a Lewis base. There is no suggestion or motivation within Rosch to one of skill in the art to form an unsupported and isolated catalyst system.

The Office Action asserts that the present invention is *prima facie* obvious in the absence of new or unexpected results. The present invention is not merely a rearrangement of reaction steps in the prior art. In the present invention, an aluminoxane is reacted with a Lewis base to form a particulate suspension prior to the addition of either metallocene or monomer. This process is neither taught nor suggested in the references and produces a different catalyst system than those described in the art. In fact, the catalyst system of the present invention is a novel material: an unsupported and isolated catalyst comprised of a metallocene, an aluminoxane, and a Lewis base.

Because Claims 1 is not obvious, dependent Claims 2-9, 13-14, and newly added Claim 18 are also not obvious. In addition, newly added Claim 16 is not obvious in view of the

references. Claim 16 is drawn to a process for producing an insoluble or slightly soluble particulate suspension by reacting an aluminoxane and a Lewis base in a hydrocarbon solvent. None of the references would have rendered newly added Claim 16 obvious because none suggest the formation of a particulate suspension by first reacting an aluminoxane with a Lewis base. As none of the references would have rendered the claimed invention obvious, the rejection should be withdrawn.

B. Rejection of Claim 15 under 35 U.S.C. § 103(a)

The Office Action has rejected Claim 15 under 35 U.S.C. § 103(a) as being unpatentable over Ernst or Fischer, either one in view of WO 97/02297 to Speca *et al.* (hereinafter “Speca”).

As an initial matter, neither Ernst nor Fischer would have individually rendered the claimed invention obvious. The present invention is directed towards a process for preparing a prepolymerized catalyst system for olefin polymerization.

Ernst does not motivate the process of preparing an unsupported, prepolymerized catalyst because Ernst is directed to supported catalyst systems. Ernst would not have been motivated to produce an unsupported catalyst system because Ernst is directed to heterogeneous catalysis and no unsupported, isolated catalyst heretofore existed for olefin polymerization.

Fischer likewise does not motivate the process of preparing an unsupported, prepolymerized catalyst because Fischer is directed to a soluble, solution phase catalyst system. Fischer would not have been motivated to produce an unsupported, isolated catalyst system because Fischer is directed to homogeneous catalysis.

Specia is directed to the prevention of reactor fouling via prepolymerization of a supported catalyst system formed from a metallocene and an aluminoxane.

The combination of Ernst in view of Specia would not have rendered the claimed invention obvious. Addition of the prepolymerization step of Specia to Ernst would not produce the catalyst system of the present invention, but would produce a prepolymerized, supported catalyst system. One of skill in the art would not have been motivated to modify the Ernst catalyst system to produce an unsupported and isolated catalyst system.

The combination of Fischer in view of Specia likewise would not have rendered the claimed invention obvious. One of skill in the art would not have been motivated to modify Fischer by adding the prepolymerization step of Specia because Fischer is directed to a solution phase, homogeneous catalyst system whereas Specia is directed to a heterogeneous catalyst system. Prepolymerization of a solution phase, homogeneous catalyst system would not provide the catalyst system of the present invention.

There is no motivation for adding the prepolymerization step of Specia to either the supported catalyst system of Ernst or the solution phase catalyst system of Fischer. Therefore, this rejection should be withdrawn.

Because Claim 15 is not obvious, newly added dependent Claim 19 is also not obvious.

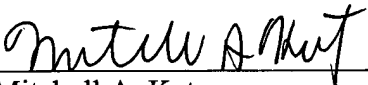
As all of the rejections have been overcome, applicants request a Notice of Allowance be issued.

ATTORNEY DOCKET NO. 04150.0019U1
APPLICATION NO. 10/526,209

A Credit Card Payment Form PTO-2038 authorizing payment for a two-month extension of time in the amount of \$ 450.00 is enclosed. This amount is believed to be correct; however, the Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 14-0629.

Respectfully submitted,

NEEDLE & ROSENBERG, P.C.

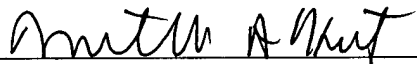


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Mitchell A. Katz

30 march 2006
Date